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WAR DEPARTMENT FIELD MANUAL

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CREW DRILL AND
SERVICE OF THE PIECE
MEDIUM TANK, M4-SERIES

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WAR DEPARTMENT • 15 SEPTEMBER 1944
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CREW DRILL AND SERVICE OF THE PIECE MEDIUM TANK, M4 SERIES

(105-MM HOWITZER)



WAR DEPARTMENT-15 SEPTEMBER 1944

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WAR DEPARTMENT

Washington 25, D.C. 15 September 1944

FM 17-76, Crew Drill and Service of the Piece Medium Tank, M4 Series (105-mm Howitzer), is published for the information and guidance of all concerned.

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CREW DRILL AND SERVICE OF THE PIECE MEDIUM TANK, M4 SERIES*

(105-MM HOWITZER)

Section I

GENERAL

- 1. PURPOSE AND SCOPE. This manual is designed to present instructional material for the platoon leader and tank commander in training the members of the crew of the medium tank with 105-mm howitzer for combat. It is to be used as a guide to achieve orderly, disciplined, efficient execution of mounted and dismounted action, and precision, accuracy, and speed in the service of the piece. It provides a logical and thorough routine for all inspections of the vehicle and its equipment.
- **2. REFERENCES.** See FM 21-6, FM 21-7, and FM 21-8.

[•] For military terms not defined in this manual see FM 20-205.

Section II

CREW COMPOSITION AND FORMATIONS

3.	COMPOSITION.	The	medium	tank	crew	is	com-
po	sed of five member	ers:					

Tank commander ______(LIEUTENANT or SERGEANT)

Gunner ______(GUNNER)

Bow Gunner (assistant driver (radio operator in tanks equipped with SCR-506)) _______(BOG)

Tank driver ______(DRIVER)

Cannoneer (loader and assistant gunner) (tends voice radio) ______(LOADER)

- 4. FORMATIONS. a. Dismounted posts. The crew forms in one rank. The tank commander takes post two yards in front of the right track, facing the front. The gunner, bow gunner, driver, and cannoneer, in order, take posts on the left of the tank commander at close interval.
- b. Mounted posts. The crew forms mounted as follows:
- (1) Tank commander. In the turret, standing on the floor, or sitting or standing on the rear turret seat.
- (2) Gunner. On the gunner's seat, on the right of the gun.

- (3) Bow gunner. In the bow gunner's seat.
- (4) Driver. In the driver's seat.
- (5) Cannoneer. Standing in the turret, or sitting on the cannoneer's seat at the left of the gun.

Section III

CREW CONTROL

5. OPERATION OF INTERPHONE AND RADIO.

- a. The crew must practice continually with the interphone to obtain its maximum value during combat. It will be used for tank control during operation of the vehicle, radio operation being interrupted during that time.
- (1) Helmets and microphones should be worn at all times during crew drill. As standard operating procedure, after mounting, headsets and microphones are tested according to the following procedure:
- (a) Cannoneer. 1. Turns OFF-ON switch of radio receiver to ON. (See TM 11-600 for operation of radio and interphone.)
- 2. Turns OFF-ON switch of transmitter (SCR-508, SCR-528) to ON. (Allow 30 seconds for tubes to warm.)
- 3. Pushes button of the assigned channel number until it locks.
- (b) Crew members. Each crew member inserts the plug of the short cord, extending from his earphones, into the breakaway plug of the headset extension cord of his interphone control box. The microphone is fastened securely in its proper position on the throat or lip to produce maximum clarity of transmission. The microphone is connected to the breakaway plug on the microphone cord of the control box.
- (c) Commander. 1. The tank commander depresses the switch on his microphone cord, and orders,



Figure 1. Medium tank, M4 (105-mm howitzer)-front view.

CHECK INTERPHONE. (NOTE: This command is used when the crew mounts by any other method than the drills given in paragraph 8 or 24. In those drills the "Ready" report constitutes the interphone check.) Each member of the crew in the following order: gunner, bow gunner, driver, cannoneer, throws his radio-interphone switch to INT, depresses his microphone switch and reports: BOG CHECK, LOADER CHECK, etc. Upon completion of his report, he immediately returns his switch to RADIO. During this procedure, each crew member adjusts the volume control on his interphone control box to the desired level. Care must be taken that the microphone switch does not remain in the locked position. Likewise, the electric cords and the suspension strap must not be

wrapped around the hand switch lest they press down on the switch button and cause the dynamotor to burn out.

- 2. Upon completion of the interphone check at the end of the Before Operation Inspection, or during combat at the last opportunity before the imposition of radio silence, the tank commander tests the operation of the tank radio within the net. To do this he turns his radio-interphone switch to RADIO and either waits for the platoon net to be opened by the NCS or, if the net is open, reports that the Before Operation Inspection is complete.
- (2) Control box positions. Interphone control box positions are as follows:
 - (a) Driver. On blower bracket above transmission.



Figure 2. Medium tank, M4 (105-mm howitzer)-side view.

- (b) Bow gunner. On blower bracket above transmission.
 - (c) Gunner. On right wall of turret to his right.
- (d) Tank commander. On right wall of turret next to gunner's control box. He controls his transmission by manipulating the switch on his control box, marked RADIO-INT, to the type of transmission desired.
- (e) Cannoneer. On left wall of turret to his rear beside the radio.
- (3) Switches. The RADIO-INT switches on all control boxes, except the tank commander's, must be set on RADIO. This is the normal position for interphone operation. The tank commander's switch will be set at INT most of the time; he will change it to RADIO only as he desires radio communication. Except in an emergency, no one but the tank commander may operate the RADIO-INT switch on his control box. In an emergency, a member of the tank crew may communicate with the tank commander or another crew member by throwing his control box switch to INT: but this action will interrupt the tank commander's radio reception. It is the duty of the tank commander to monitor his radio receiver at all times except when speaking over the interphone or transmitting over the radio.

b. First echelon radio check. As a part of the daily Before Operation Inspection the tank commander will make the following first echelon radio check:

- (1) Cords. (a) See that insulation and plugs are dry, unbroken, clean, and making good contact.
- (b) Arrange loose cordage to prevent its entangling personnel or equipment.
 - (2) Antenna. See that-
- (a) Mast is complete, held securely by lock screw on mast base, and sections are tight and taped.

- (b) Leads at transmitter, receiver, and mast base are intact, properly insulated, and tightly connected.
 - (c) Mast base is clean, tight, and not cracked.
- (d) Insulators passing through armor plate and bulkheads are whole and in place.
- (3) Set mountings, snaps, snubbers, etc. Check for security and condition.
- (4) Microphones, headsets, and controls. Check for condition and proper position. Replace from spares if necessary and turn in defective items for repair or replacement.
- (5) Spare antenna sections. See that they are correctly placed in the roll and stowed to avoid being damaged or interfering with personnel.
 - (6) Ground lead. Check connection at both ends.
- (7) Tubes. See that spare tubes are sealed in containers bearing date of last test. Turn in defective tubes at the earliest opportunity.
- (8) Fuses. Check condition, and spare supply for numbers and proper rating.
- (9) Cleanliness. See that both radio and equipment are clean.
- (10) Battery voltage. Have driver check battery voltage. If it is low, warn cannoneer to start auxiliary generator (have this started whenever radio is operated continuously and tank engine is not running).
- (11) Crystals. Check for number, position and frequency. Be sure required crystals are present.
- c. It is the duty of each man invariably to check his personal interphone equipment upon mounting the tank; he should see that it is properly maintained, and report any difficulties to the tank commander.
- d. Definite tank control, commands, and terminology are set forth in paragraph 6. The desirability

and necessity of adhering to this specific language cannot be overemphasized. General conversation on the interphone causes misunderstanding and disorder and is harmful to discipline.

6. INTERPHONE LANGUAGE. a. Terms.

· IIIIIIIII EIIIIO	TOLI WI TUINDI
Tank commander	_LIEUTENANT or
	SERGEANT
Driver	_DRIVER
Gunner	_GUNNER
Cannoneer	_LOADER
Bow gunner	BOG
Any tank	
Armored car	
Any unarmored vehicle	_TRUCK
Any antitank gun	_ANTITANK
Infantry	
Machine gun	
Airplane	
b. Commands for movem	ent of tank.
To move forward	DRIVER MOVE OUT
To halt	DRIVER STOP
To reverse	
To decrease speed	DRIVER SLOW
-	DOWN
To turn right 90°	DRIVER CLOCK 3-
	STEADY ON
To turn left 60°	
	STEADY ON
To turn right (left) 180° -	
	RIGHT (LEFT)-
	STEADY ON

To have driver move toward a terrain fea- ture or reference point, the tank being headed in proper direction.	WHITE HOUSE (HILL, DEAD TREE,
To follow in column	DRIVER FOLLOW THAT TANK (DRIVER FOLLOW TANK NO. B-9)
To follow on road or trail	DRIVER RIGHT ON ROAD (DRIVER RIGHT ON TRAIL)
To start engine	_DRIVER CRANK UP
To stop engine	
To proceed in a specific _ gear	DRIVER THIRD GEAR (FIRST GEAR) (FOURTH GEAR)
To proceed at same speed	_DRIVER STEADY
c. Commands for control	
To traverse turret	-GUNNER TRAVERSE LEFT (RIGHT)
To stop turret traverse	_GUNNER STEADY ON
d. Fire orders. See FM 17	7–12.

Section IV

CREW

DRILL

- 7. DISMOUNTED DRILL. a. To form crew. Being dismounted, the crew takes dismounted posts at the command FALL IN.
- b. To break ranks. Crew being at dismounted posts, at the command FALL OUT, the crew breaks ranks. Crew members habitually fall out to the right of the tank.
- c. To call off. Crew being at dismounted posts, at the command CALL OFF, the members of the crew call off in turn as follows:
 - (1) Tank commander ____. "SERGEANT" (or "LIEUTENANT")
 - (2) Gunner _____"GUNNER"
 - (3) Bow gunner _____"BOG"

 - (4) Driver ______"DRIVER"
 (5) Cannoneer _____"LOADER"
- d. To change designation and duties. (1) Crew being at dismounted posts, at the command FALL OUT SERGEANT (GUNNER) (DRIVER)-
- (a) The man designated to fall out moves by the rear to the left flank position and becomes cannoneer.
- (b) The crew members on the left of the vacated post move smartly to the right one position and prepare to call off their new designations.
- (c) The acting tank commander starts calling off as soon as the crew is re-formed in line.

- (2) The movement may be executed by having any member of the crew fall out except the cannoneer.
 - (3) All movements should be executed with snan and precision and at double time

(9) An inovements should be executed with snap and precision and at double time.		Cannoneer	,		About face.			Mount left	fender.	Mount left	sponson.	田	and take post.	Turn on radio.		
and precision ar		Driver			About face,			Stand fast.		Mount right	fender.	Enter driver's	seat.	Close battery	master	switches.
recured with snap	smounted posts.	Bow Gunner	•		About face.			Stand fast.				Mount right	t. fender.	Enter bog's	seat.	
ziits siiouid be ex	drew being at di	Gunner			About face.			Mount right	fender.	. Mount right	sponson.	Enter turret	and take post.			
(e) All IIIOVEIIIR	8. TO MOUNT. Crew being at dismounted posts.	Tank Commander	Command: PRE-PARE TO	MOUNT.	About face.	Command:	MOUNT.	Stand fast.		Mount right fender. Mount right		Mount right	sponson.	Enter turret and,	take post.	

Connect breakaway Connect break- Connect break- Connect break- breakaway plugs. away plugs. away plugs. away plugs. plugs.

Command: REPORT.

Report "Gunner ready".

Report "Bog ready".

Report "Loader ready". Report "Driver ready".

9. TO CLOSE AND OPEN HATCHES, a. To close hatches. Crew being at mounted

posts.

Command: CLOSE Tank Commander

HATCHES.

Gunner

Bow Gunner

Cannoneer

Driver

Release turret

sure that turlock and intraversing

ret weapons do not block

hatches.

13

Cannoneer	Close hatch.						Report "Loader	ready".
Driver		Raise periscope.				Report "Driver	ready".	
Bow Gunner	Close hatch.	Raise periscope.			Report "Bog	ready".		
Gunner				Report "Gun-	ner ready".			
Tank Commander	Close hatch.	-	Command:	REPORT.				
14								

b. To open hatches. Crew being at mounted posts.

Cannoneer Driver Bow Gunner Gunner Tank Commander Command: OPEN

Lower peri-

scope.

HATCHES.

Release turret Lower peritraversing scope.
lock and insure that turret weapons do not block hatches.

Open hatch.	•	Report "Loader ready".
Open hatch.	. !	Report "Driver ready".
Open hatch.	Report "Gunner ready". Report "Bog	ready".
Open hatch. Command:	REPORT.	

Cannoneer	Disconnect breakaway plugs. Turn off radio.
Driver	Disconnect breakaway plugs. Open battery master switches.
Bow Gunner	Disconnect breakaway plugs.
Gunner	Disconnect breakaway plugs.
Tank Commander	Command: PRE- PARE TO DIS- MOUNT. Disconnect break- away plugs.

Command: DISMOUNT. 15

Cannoneer	Emerge from	Move to left	\geq	Take dis-	mounted post.	
Driver	Emerge from	Move to left fender	ake dis- Take dis-	moduce post		
Bow Gunner	Emerge from hatch.	Move to right fender.	Ξ			
Gunner	Stand fast.	Emerge from turret.	Move to right sponson.	Move to right	fender. Take dis-	mounted post.
Tank Commander	Emerge from turret. Stand fast.	Move to right sponson.	Move to right fender.	Take dismounted	post.	

11. TO DISMOUNT THROUGH ESCAPE HATCH. Without weapons, crew being at mounted posts.

Cannoneer

Bow Gunner Gunner Command: THROUGH ES-CAPE HATCH, PREPARE TO Tank Commander DISMOUNT.

Disconnect breakaway plugs. Command: DIS-MOIINT	Disconnect breakaway plugs. Traverse turret to give access from loader's to bog's com- partment.	Disconnect breakaway plugs. Open escape hatch.	Disconnect breakaway plugs. Help bog open hatch if necessary. Open battery master switches.	Disconnect breakaway plugs. Turn radio off.
Stand fast.	Stand fast.	Dismount through es-	Stand fast.	Stand fast.
	Move to left	Crawl from un-		Move into bog's
	side or turret.	der tank and take dis-		and dismount.
Move to left side of turret.	Enter bog's compartment and dismount.	mounted post.		Grawl from under tank and take dismonstrated nost

Tank Commander	Gunner	Bow Gunner	Driver	Cannone
Enter bog's com-	Crawl from un-			-
partment and	der tank and			
dismount.	take dis-			
	mounted post.		•	
Crawl from under			Move to bog's	
tank and take			compartment	
diemounted noct			and dismount.	
aismounted post			Crawl from un-	
			der tank and	
			take dis-	
			mounted post.	

unexpected periods of pep drill are introduced into the training. Pep drill is a series of precision movements executed at high speed and terminating at the position of atten-12. PEP DRILL. To vary the drill routine and to keep the interest of the crew members, tion either mounted or dismounted. For example, the crews being dismounted, the platoon commander may command, IN FRONT OF YOUR TANKS, FALL IN, MOUNT; FORWARD, MARCH, BY THE RIGHT FLANK, MARCH, TO THE REAR, MARCH, MOUNT. Preparatory commands for mounting and dismounting are normally omitted DISMOUNT; FALL OUT SERGEANT; ON THE LEFT OF YOUR TANKS, FALL IN; from this type of drill. Posts of all crew members are changed frequently.

Section V

SERVICE OF THE PIECE

- 13. GENERAL. a. The crew of the howitzer consists of the gunner, who aims and fires the piece; the cannoneer, who loads the piece; and the tank commander, who controls and adjusts fire.
- b. Training in service of the piece must stress rapidity and precision of movement and teamwork.
- 14. POSITIONS OF HOWITZER CREW. Positions of the howitzer crew are as prescribed in paragraph 4 b.
- 15. OPERATION OF HOWITZER. a. To open the breech. Grasp the breech operating handle and squeeze the latch until it is disengaged from its catch. Push the breech operating handle to the rear and right as far as it will go.
- b. To load. Holding a round of ammunition with the right hand at the base of the cartridge case and the left hand at the middle of the assembled round, insert the nose of the projectile carefully into the chamber to avoid striking the fuze. Remove the left hand and with it grasp the operating handle. Clench the right fist, and thrust the round home into the chamber. As the rim of the cartridge case engages the extractor, it starts the closing motion of the breechblock. When this motion is felt, close the breech by moving the operating handle to the left and forward

with the left hand. Check to see that the latch locks the handle in the closed position. Move the body and both arms to the left clear of the path of recoil, and signal "Ready" by tapping the gunner's left leg with the foot.

- c. To lay the piece. Bring the target into the field of the telescope by the quickest practicable method, under guidance of the tank commander or by use of the periscope. To lay for direction traverse until the center line of the telescope is on the center of the target or until the proper sight picture is obtained. Make the final traversing motion against the greatest resistance, such as might be caused by cant in the tank. Then move the piece until the target shows at the proper range indicated by its relation to the range lines of the reticle. Adjustment is calculated so as to depress the muzzle with the final motion.
- d. To fire the piece. Before firing, move the firing switch on the instrument panel to "ON". To fire, with the right heel depress the right hand firing switch button on the turret basket floor. If the piece fails to fire proceed as in paragraph 16. It may also be fired mechanically by depressing the firing pedal at the front edge of the basket floor.
- e. Safety precautions. (1) Before loading each round, the piece will be inspected to see that there is no obstruction in the bore.
- (2) The gunner must release the firing switch button of firing pedal after firing to avoid injury to the cannoneer.
- (3) The gunner waits for the cannoneer's signal that the gun is loaded and he is clear of the recoil before operating the firing switch.
- (4) After firing, during range and combat practice, the howitzer will be inspected by an officer to see

that it is unloaded before the tank is moved or personnel is allowed to move in front of it.

- (5) In loading the piece, care must be taken not to strike the fuze or primer of a shell against any solid object; after loading, the cannoneer must take care to remain clear of the path of recoil.
- (6) Stuck rounds will be removed from the bore only with rammer, cleaning and unloading M5, or with the rammer M1, which are made for this particular purpose. The method of removing is given in g and h below.
- (7) Ammunition will be cleaned and inspected before stowing and each round will again be inspected before loading.
- (8) Fuzes will not be disassembled or tampered with in any way.
- (9) In case of a misfire, the firing switch is immediately opened before recocking. Do not touch breech mechanism until the firing switch has been opened.
 - (10) See safety requirements of AR 750-10.
- f. To unload an unfired round. The cannoneer cups his hands close behind the breech to catch the base of the round as it emerges and to prevent it from slipping out and dropping to the floor. The gunner opens the breech slowly. (Do not attempt to open the breech rapidly, or the case may become separated from the projectile.) He then removes the round and returns it to its rack.
- g. To remove a stuck projectile. If, in spite of care in opening the breech, the case and projectile do become separated, the projectile is fired out whenever possible; this is especially true in combat where unnecessary exposure of personnel is to be avoided. If

it must be removed without firing the piece, the chamber should be filled with rags to form a cushion, the breech closed, and the shell rammed loose as described in h below and removed.

h. To unload a stuck round. When a round is stuck in the piece and it is either impossible or inadvisable to fire it out, it will be removed, except in combat, under the direct supervision of an officer. The breech being open, the cannoneer takes position to receive the round as it is pushed from the chamber, while the bow gunner or gunner dismounts and rams the round out. Using the rammer, cleaning and unloading M5, insert it in the muzzle of the gun and push it gently down the bore until it is seated on the ogive of the projectile. Exerting a steady pressure, shove the round clear so that it may be removed by the cannoneer. If the weight of several men against the staff does not suffice (under no circumstances will the staff be used to hammer against the projectile), apply leverage by means of a 2" x 4" piece of wood or other suitable object connected to the tank by a rope at one end, or use the rammer M1, which provides a controlled and properly cushioned blow. Keep all parts of the body as clear as possible from the muzzle or breech during the operation. If this procedure fails to remove the round, experienced ordnance personnel should be called. In combat, to avoid exposing personnel to enemy fire, the round can sometimes be pried out by using the base of an empty shell case as a lever.

16. MALFUNCTIONS. Malfunctions of the howitzer may be divided into three general classes: failure to load, failure to fire, failure to extract. Below are given the causes of the principal types of failure and the immediate action remedy to be applied.

a. Failure to load.

Failure

Round does not Stuck round. Remove round. fully enter Check for obstrucchamber. tion in chamber. Check for dirty round, and clean. Check for "bulged" (deformed) round. For removal of separated or stuck rounds see 15 g and h above. Withdraw round Breech does not Insufficient close. force in pushand try again. ing round home, to clear breechblock. Bent or under- Turn round so that sized case rim, rim engages extractors, or use new round. Obstruction, Remove obstrucdirt or friction or dirt from tion, in breech recess if present; mechanism. otherwise remove, disassemble, clean, and lubricate breech-

Cause

block.

Worn or broken Replace extractor.

extractor.

Immediate Action

and Remedy

b. Failure to fire.

Failure .	Cause	Immediate Action and Remedy
Piece does not return to battery.	Obstruction be- tween breech ring and rear portion of mount.	Drive out obstruction, or, if necessary and jack is available, use tank jack between breech ring and shoulder guard bracket of mount, to release obstruction.
	Excessive friction of tube in cradle bearing.	Relubricate. Take to ordnance if condition per- sists.
	Too much recoil oil.	Remove excess oil.
If piece is in battery:		
Action of trigger mechanism restricted.	Safety on "Safe".	Move safety to "Fire".
Blow of firing pin fails to fire round.	Defective round.	Recock piece and attempt to fire a second time.
		Remove round to determine cause of misfire. (AR 750-10.) (See paragraph 15 for removal of live rounds.)

Failure		Cause	and Remedy								
		Weak blow on primer due to: obstruction, dirt or friction in firing mechanism.	Dissassemble fir- ing mechanism and remove ob- struction or dirt, clean, relubri- cate, and assem- ble.								
		Broken tip on firing pin.	Replace firing pin.								
		Broken or weak firing spring.	Replace firing spring.								
Firing pin to strike primer.	fails	Obstruction, dirt, or friction in firing mechanism.	Disassemble, and remove obstruc- tion, clean, lu- bricate.								
		Weak or broken firing spring.	Replace.								
		Defective firing pin.	Replace.								
										Defective cocking lever.	Replace.
									Defective cocking fork.	Replace.	
		Defective cocking lugs, on percussion mechanism.	Replace mechanism.								
		Defective sear.	Replace.								

Immediate Action

c. Failure to extract.

Failure	Cause	Immediate Action and Remedy
Breech opens, but case is not extracted.	Broken extractor.	Pry or ram out empty case and replace extrac- tor.
	Undersized or bent rim.	Pry or ram out.

Section VI MOUNTED ACTION

17. TO PREPARE TO FIRE. Crew being at dismounted posts, hatches open. The antiaircraft gun is uncovered and half loaded as the tactical situation dictates.

	and and solv	man air en nan	,	
Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
Command: PREPARE TO FIRE.				
Clean gunner's, loader's and sergeant's periscopes, gun telescope and cupola vision blocks.	Unlock travel- Lower seat. ing lock; ele- Release travel- vate howitzer. ing lock. Check travers- Half load bow ing and ele- gun. vating mech- Clean peri-		Lower seat. Clean periscopes. Close hatch; raise periscope.	Inspect bore and chamber of howitzer. ¹ Half load co-axial machine gun.
anisms. scopes. Inspect smoke	anisms.	scopes.	:	Inspect smoke
	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		*** C 40 C 12 C 1	

¹ If tape muzzle cover is in place, inspection does not require its removal. If cover is unbroken no foreign material has entered the muzzle.

ver Cannoneer	mortar; load	mortar.	Open floor com-	partment.		Check 105-mm	rounds,	smoke bombs,	and machine	gun ammuni-	tion.		•			Driver	ž	ready".
Driver	,															Report "Driver	ready".	
Bow Gunner	Check ammuni-	tion.	Close hatch;	raise peri-	scope.	•	-								Report "Bog	ready".		
Gunner	Check firing	controls (in-	cluding sole-	noids).	•	Check peri-	scope and	sights. 2	Uncover and	check eleva-	tion quadrant	and azimuth	indicator.	Report "Gunner	ready".	•		
Tank Commander			-			Check vane sight.			Close hatch if	desired.			Command:	REPORT.				

² Periscope will be already raised since after the initial adjustment for the day it should not be lowered. Lowering the periscope may spoil the adjustment.

18. DUTIES IN FIRING.

TO: TO TITED THE PARTY OF				
Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
Give fire orders (FM 17-19)		Fire on designated	Turn on venti-	Load type amminition in-
Turn on exhaust		and on emer-	if not already	dicated in fire
fan.		gency targets		order (inspect
		that appear.		each round).
Observe and sense Fire on targets	Fire on targets	When not fir-	0	Signal READY
each round and	designated.	ing, observe	signed sector	each time
notify gunner of	Observe and	in assigned	and be pre-	piece is
changes in range	sense all	sector.	pared to	loaded by
or deflection.	rounds		move tank as	tapping gun-
•	$\operatorname{through}$		ordered.	ner on left
	sights.			leg.
Control driver with Continue to fire	Continue to fire			Reload all tur-
interphone.	as directed.			ret weapons.
•				See that all
•				fuzes are at
				DELAY un-
				less ordered
				otherwise.

Tank Commander	Gunner	Bow Cunner	Driver	Cannoneer
	Call MISFIRE			In case of mis-
	if piece fails			fire, check
	to fire.			that breech is
				closed, piece
				in battery; re-
				cock piece
				and signal
				READY to
				gunner.
	Call STOP.			Reduce stop-
	PAGE if co-			pages in co-
	axial gun fails			axial machine
	to fire.			gnn.
	Tell loader			Fire coaxial gun
	when to fire			by hand
	coaxial gun if			when di-
	solenoid fails			rected by
	to operate.			gunner.
Fire AA gun.				Fire AA gun.

Determine when Rotate turret as mortar smoke directed by screen should be sergeant in laid and give adjusting commands to pro- smoke screen. duce the desired effect.

When ordered by In indirect fire:
platoon commander, adjust direction.
indirect fire from Lay piece for forward position.

Indicate aiming Fire piece on point to gunner. command.

Make designation.

Set off deflec-

nated corrections in deflection

Keep mortar loaded at all times; adjust range, and fire immediately on command of sergeant.

Keep record of ammunition expended for entry in gun book by platon leader (number of rounds each

Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
	and eleva-			Inform sergean
	tion.			when ammu-
	During lulls in			nition needs
	normal activ-			to be re-
	ity observe in			stowed.
	assigned sec-			During lulls in
	tor.			normal activ-
				ity observe in
				assigned sec-

19. TO SECURE GUNS¹. In battle this operation is normally followed by RE-STOW NOITIVITY

tor.

	Cannoneer
	Driver
	Bow Gunner
	Gunner
MANAGEMENT OF W.	Tank Commander

Command: (CEASE FIR-

ING) SECURE GUNS.

machine gun. Clear coaxial Lower periscope. Turn off firing Clear bow machine gun; switch. Raise and mount Open hatch.

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Clear howitzer; inspect bore	and close breech.	Clear smoke	mortar.	Open hatch.						Keport Loader readv".
Open hatch (first check		R	convoy posi-	tion.					Renort "Driver	ready".
engage tra- veling lock.	Lower peri- scope.	Open hatch	(first check	position of	howitzer).	Raise seat to	convoy posi-	tion.	Report "Bog	ready".
Lock howitzer in travel po-	sition. ²	Lock turret	lock. ²					Report "Gun-	ner ready".	
convoy seat.							Command:	REPORT.		

tice. If time permits, additional operations and checks are performed. The gunner checks ¹The above drill is the minimum number of operations required to put the tank in sight adjustment and covers the elevation quadrant bubble and the azimuth indicator. The tank commander may order the bores of all weapons swabbed and their muzzles proper condition to march after it has been prepared for combat or after range prac-

² Normally omitted in range procedure.

- 20. TO LOAD ALL WEAPONS. The howitzer is loaded on order. This is normally the fire order, but some types of action will dictate loading prior to the appearance of a target. Machine guns are clear until the command PREPARE TO FIRE, when they are half loaded. When the fire order is given, however, or if the unit is deployed for combat, all machine guns will be fully loaded. This does not necessarily apply to the antiaircraft gun, which is uncovered and half loaded as the tactical situation dictates.
- 21. USE OF AMMUNITION. a. The order of withdrawing ammunition from its stowage space in the tank is based on the principle that some readily accessible rounds always will be saved for emergency use. Other crew members will pass ammunition to the cannoneer if necessary to prevent his having to use these rounds. During combat, the position of the turret will affect the accessibility of the ammunition in various parts of the tank. In drill, however, to establish a sound method from which commanders may deviate as the need arises, the following procedure should be adhered to:
- b. Ammunition is taken from its stowage space in the tank in the order: (1) Three front rows left of power tunnel; (2) racks beside bow gunner in right sponson; (3) top racks behind bow gunner. The two rear rows left of the power tunnel will be saved as a reserve for action where speed of loading is of the utmost importance. As time permits, or on the command RE-STOW AMMUNITION, rounds are moved from the racks beside the gunner in the right sponson and from the bottom racks behind the bow gunner to those which have been emptied in firing.

- c. Upon completion of re-stowing, reports are given on the number of rounds remaining. For example the bow gunner reports, "Three smoke, six HE remaining in forward racks right sponson; one-two HE remaining right of power tunnel". The gunner reports, "Rear racks right sponson empty". The cannoneer reports, "Three smoke, three HEAT, one-nine HE remaining left of power tunnel".
- 22. TO LOAD AMMUNITION. Ammunition for the howitzer will be crimped upon assembly and should then be loaded and stowed with great care to avoid striking the fuze end or the primer on a hard surface, burring the rotating band, or denting the case. (See TM 9–1900.) If time is available, each crimped round should be tried in the piece before stowing to see that it can be loaded. If for some reason rounds cannot be crimped, each case should be tried in the piece prior to assembly of the round. All rounds of HE will be set at FUZE DELAY at this time. Both howitzer and machine gun ammunition will be passed through the hatches as most convenient under the circumstances, a man being stationed on the forward or rear hull to relay it to those in the tank.

Section VII

DISMOUNTED

23. TO FIGHT ON FOOT. a. Crew being at mounted posts, hatches open. Crew members, including the tank commander, keep below hatches until completely ready to dismount and go into action and until the order DISMOUNT is given.

Cannoneer	Disconnect breakaway plugs.
Driver	Disconnect breakaway plugs. Receive tripod from bog.
Bow Gunner	Disconnect breakaway plugs. Pass tripod to driver.
Gunner	Disconnect breakaway plugs.
Tank Commander Command: PRE- PARE TO FIGHT ON FOOT.	Disconnect breakaway plugs. Order distribution of grenades.

Procure gre- nades as ordered.	Help driver get ammunition. Take 1 box cal .30 ammuni- tion.	Stand fast.
		Receive bog's submachine gun and ammunition.
Procure gre- nades as ordered.	Install elevating mechanism on bow gun; dismount gun; install pintle.	Pass submachine gun and 6 clips ammunition to driver. Take spare parts roll and spare bolt assembly.
Procure gre- nades as ordered. Stand fast.		
Take hand gre- nades, subma- chine gun and 6 clips ammunition.	Stand fast.	•

Command: DIS-MOUNT.

Cannoneer Dismount to left	Receive tripod from driver.	Dismount. Set up tripod.	Help mount bow gun; man gun as No. 1.
Driver	Pass tripod to loader.	Pass 2 boxes cal Dismount. 30 ammuni- Set up trip tion to ser- geant.	Receive box cal Pass box cal .30 Help mount .30 ammuni- ammunition bow gun; tion and sub- and subma- man gun and ammuni- and ammuni- and ammuni- tion from tion to bog. Move into tur- ret; connect
Bow Gunner		Pass bow machine gun to gunner.	Receive box cal 30 ammunition and submachine gun and ammunition from driver.
Gunner	Dismount to	right sponson. Receive bow gun from bog.	Mount bow gun; man gun as No. 2.
Tank Commander Dismount via right sponson and fender		Receive 2 boxes cal .30 ammunition from driver.	of crew. Act as squad leader of machine gun squad.
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breakaway	plugs; main-	tain contact	with platoon	leader
Man gun as	No. 3.			

b. The dismounted crew moves to the position indicated by the tank commander or, in drill, 5 yards in front of the tank. The crew members take the posts and perform the duties of the crew of a ground-mounted machine gun as prescribed for gun drill in FM 23-55 (1944 edition). c. In combat it is assumed that the tank will be moved to a concealed position if possible, before the crew dismounts. Otherwise the driver will move the tank to a concealed position before mounting to the turret.

24. TO MOUNT FROM DISMOUNTED ACTION.

er Driver Cannoneer		Disconnect		
Bow Gunner		Ĥ		
Gunner		Dismount ma-		
Tank Commander	Command: OUT	OF ACTION. Supervise taking	gun out of action	

Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
		nition and	Resume	
		submachine	mounted post. Fold tripod.	Fold tripod.
Cover other crew		gun and am-	Receive tripod; Pass tripod to	Pass tripod to
members with		munition in	place in bog's	driver.
submachine gun.	Pass bow ma-	front of	compart-	
Pass remaining cal	chine gun to	tank).	ment.	
.30 ammunition	bog.	Receive and		Mount tank with
to driver.		mount bow	Receive remain-	remainder of
		gun (remove	ing ammuni-	box cal .30
		and stow	tion; place	ammuni-
Pass bog's subma-	Take mounted	ground acces-	near loader.	tion.
chine gun and am-	post.	sories).		
munition to him.		Receive and	Connect break-	Take mounted
		stow subma-	away plugs.	post.
		chine gun		Stow ammuni-
Take mounted post. Receive and	Receive and	and ammuni-		tion.
	stow gre-	tion.		
Return grenades.	nades.	Return gre-		Receive and
Stow submachine		nades.		stow gre-
gun and ammuni-				nades.

	Connect break- away plugs.		Report "Load- er ready".
			Report "Driver ready".
Stow spare parts roll and spare bolt assembly.	Stow tripod. Connect break- away plugs.	Report "Bog	ready".
Connect break- away plugs.	0	Report "Gunner ready".	
tion. Connect breakaway Connect break-plugs.	Command:		

25. TO ABANDON TANK. If it becomes necessary to abandon tank, the crew proceeds as in paragraph 10 or 11 with the following changes or additions:

remain in the tank. Backplates are removed from machine guns and the firing pin and a. Time permiting deliberate action, the tank commander displays the flag signal DIS-REGARD MY MOVEMENTS, and supervises the disabling of those weapons which guide from the howitzer. All similar spare parts are also removed. Individual weapons and maximum possible ammunition loads are carried. The driver dismounts in order with the rest of the crew.

1	9
•	_

b. Ordinarily the tank is abandoned as a result of a direct hit either causes it to catch fire or disables it so that it becomes a vulnerable target. In such instances there may be and take cover at a safe distance from the tank. It is particularly important in case of fire to hold the breath until clear of the vehicle. Inhaling the fumes and smoke of the less than five seconds in which the crew can escape without further injury. At the command ABANDON TANK, crew members throw open hatches, climb out, jump to ground fire may injure the lungs and will at least incapacitate the individual for a time. 26. TO DESTROY TANK. When the command DESTROY TANK is given, crew members first remove what equipment is to be carried away. They then destroy the tank, weapons, ammunition, and equipment to be left, as prescribed in Section XI.

27. ACTION IN CASE OF FIRE. a. Fire in engine compartment. The first crew member to discover fire calls, ENGINE FIRE.

Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
Disconnect break-		Disconnect	Disconnect	Disconnect
away plugs.		breakaway	breakaway	breakaway
	plugs.	plugs.	plugs.	plugs.
Dismount to rear		Take hand ex-	Pull ONE fixed	Obtain
deck.		tinguisher.	extinguisher	wrenches.

Receive wrenches and fire extinguisher.	Pass hand extinguisher to sergeant.		control handle; shut off engine.	Pass wrenches to sergeant.
1	Dismount to rear deck.	Dismount.	Dismount.	Dismount.
Start to open top engine doors.		Go to rear of tank; unfasten rear engine doors, ready to open if needed.	Go to rear of tank and help as ordered.	Go to rear of tank and assist other crew members.
If fixed extinguisher Unfasten top has not put out engine door fire, use hand extinguisher through top doors or order trol handle second fixed extinguisher. If ordered to put out engine door to order trol handle second itsed extinguisher.	Unfasten top engine doors. Stand by to pull exterior control handle of second fixed extinguisher if ordered.	Use hand extinguisher through rear doors if ordered.		

b. Fire in air horn. (Applicable only to tanks equipped with radial engines.) The first crew member to discover fire calls, AIR HORN FIRE.	 a. (Applicable on) cover fire calls, A 	ly to tanks equip) VIR HORN FIRE	ped with radial en	ngines.) The first
Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
Disconnect break-away plugs.	Disconnect breakaway	Disconnect breakaway	Disconnect breakawav	Disconnect breakaway
Take wrench and	plugs. Take hand ex-	plugs. Take hand ex-	plugs. , plugs. , plugs. Take hand ex- Race engine (if	plugs. Obtain wrench
screwdriver from		tinguisher;	cranking, con-	and screw-
Go to rear of tank; Remove cone	Remove cone	disinount. Remove cone	unue m aftemot to	driver; pass to sergeant.
open rear engine	from hand	from hand ex-	start).	Dismount to
doors.	extinguisher	tinguisher	Dismount if	rear deck.
	nozzle.	nozzle.	ordered.	Stand by to op-
		Go to rear of		erate fixed
If racing engine has Go to rear of	Go to rear of	tank.		extinguisher
not put out fire,	tank; stand by Insert extin-	Insert extin-		if ordered.
cut small hole	to use extin-	guisher noz-		
with screwdriver	guisher.	zle in hole		
in air horn-intake	•	made by ser-		
tube coupling.		geant; operate		
		extinguisher.		

- c. Fire in fighting compartment. The first crew member to discover the fire calls, TURRET (or HULL) FIRE. The tank is stopped and the engine shut off. Fire extinguishers are passed to the men nearest the fire, and the crew members nearest them help in any way possible to extinguish the fire. The turret is traversed if necessary. The tank commander supervises the work and orders the crew to dismount if the fire gets beyond control.
- 28. ADVICE TO INSTRUCTORS. a. Disciplined and effective dismounted action requires long and arduous drill. Satisfactory results can be obtained only by painstaking repetition of each movement. The technique of mounting and dismounting of all crew members is observed in detail by the tank and platoon commanders and altered, if necessary, before habits are formed. Once each man has found the most efficient method of mounting and dismounting, he is encouraged to adhere rigidly to it.
- b. Training in dismounted action is best undertaken in the field rather than in the tank park. Crews are required to dismount to fight on foot on all types of terrain, and under every variety of simulated combat conditions, with full loads of ammunition. Rough terrain complicates the problem of dismounting through the escape hatch, and develops ingenuity and physical agility not possible in tank park training.
- c. Instructors must explain and demonstrate to tank crews how necessary to their safety and success in combat is a high state of training in dismounted action. They must point out that skill and practice in use of the escape hatch will pay dividends. The crew keeps the escape hatch door clean and well lubricated so that its release is immediate and positive. Frequent

inspection of the mechanism is made by the tank commander to see that the locking rods are not bent.

29. GENERAL PRECAUTIONS. a. Fire prevention.

- (1) Smoking in or on the tank is prohibited.
- (2) During fueling a crew member stands on the rear deck holding a fire extinguisher with the nozzle trained on the fuel inlet, ready to use it instantly if needed.
- (3) Use of gasoline for cleaning any part of the tank is prohibited.
- b. Mounting and operating tank. (1) Crew members mount and dismount by the front of the tank except during range practice.
- (2) Unnecessary contact with any part of the weapons or sighting equipment will be avoided. This includes—
- (a) Stepping on the howitzer barrel or shield, or the machine guns in mounting or dismounting.
- (b) Supporting oneself by holding the tube, howitzer shield, or machine guns in mounting or dismounting.
- (c) Use of the shoulder guard as a step in entering or leaving the turret.
- (3) Crash helmets if available, or helmet liners are worn at all times inside the tank.
- (4) In operating cross country the tank commander warns the driver and crew when the tank approaches rough terrain.
- (5) Where possible the driver avoids rough or uneven ground which might cause injury to the tank or crew.
- (6) In traveling with hatches open over rough ground or through woods, crew members constantly

check the engagement of the cover latching mechanism and the security of covers in the open position.

- (7) The antenna is lowered to prevent contact with low branches or low-hanging wires, especially those which may carry high voltage electricity.
- (8) The tank is driven in low range when being moved forward in confined spaces.
- c. Park and bivouac precautions. (1) Sleeping underneath, behind, or in front of tanks should be prohibited.
 - (2) In moving a tank in park or bivouac-
- (a) A guide is always employed to direct the movement.
- (b) The guide's position is at least ten feet in front of the tank and to one side, clear of its path, in directing the tank either forward or back.
- (c) At night the guide is especially charged with seeing that the path ahead of and behind the tank is clear of personnel, particularly those sleeping on the ground.
- (d) The guide moves at a walk to avoid stumbling on uneven ground.
- d. Miscellaneous. (1) After machine guns are cleared a cleaning rod is pushed through the barrel and chamber to insure that the chamber is empty. A T-block is then inserted into the receiver.
- (2) Tank weapons, except the antiaircraft gun, are fired only when the driver's and bow gunner's hatches are closed.
- (3) Care will be taken, while working about a running engine to keep fingers and hands away from fans; fan belts, drive shafts, and other moving parts.
 - (4) 105-mm ammunition will be securely stowed.

- (5) Ammunition will not be carried on the rear deck.
- (6) No items of equipment will be carried on the rear deck in such a manner as to block the air inlet grilles.
- (7) There is danger of monoxide poisoning for the crew of a towed tank when the medium tank or a tank recovery vehicle mounted on tank chassis is used as the towing vehicle. This danger is greatest when the towing vehicle is powered with a radial engine, and when a short hitch, such as that obtained with the towing bar, is used. Men should be kept out of the towed tank wherever possible; but where this is not possible, frequent periodic check of the occupants of the towed vehicle should be made.

Section VIII

EVACUATION OF WOUNDED FROM TANKS

30. GENERAL. Wounded members of the tank crew will normally be removed from disabled tanks by their fellow crew members. The operation requires the utmost speed to save the lives of those who are unhurt as well as of the casualty. A tank set afire by an enemy hit can trap its crew in a matter of seconds: and an enemy who has determined the range and disabled a tank with a direct hit will probably continue shooting until the vehicle burns. It is essential, therefore, that all crew members become extremely proficient in the quickest methods of removing one another from the tank. Speed is the primary requisite; care in handling will be stressed only where it has been possible to move the tank to cover. If the action has ceased momentarily, or the tank has been able to disengage itself without hindering the accomplishment of the mission, the casualty is removed on the spot and then carried to a protected place where emergency first aid is administered. Otherwise the action will be continued until such an opportunity is presented.

31. METHODS EMPLOYED. The methods of evacuation described herewith are based on a two-man team, which is the largest number than can effectively work around a single hatch opening. In some cases a third man will be able to give considerable help from inside by placing belts around the wounded man or by moving him to a position where he can be grasped

from above. Speed will usually dictate that the casualty be grasped by portions of his clothing or by the arms for removal. If an arm is broken, however, or if there are other injuries which will be aggravated by such procedures and if time allows, some form of sling may be improvised which will relieve the part from further injury. Only equipment which is immediately available, like pistol belts, web belts, or field bag straps, will be used for this purpose. Suggested uses of some of these items, as well as more elaborate techniques of evacuation, will be found in FM 17–80.

- 32. DRILL. This paragraph suggests two drills which may be used as models for evacuating crew members from any position. The composition of the evacuating team should be changed frequently to provide practice for all members of the crew in meeting various emergencies.
- a. The first member of the crew to discover that another is hit and so badly wounded as to require his removal calls, BOG (LOADER) (SERGEANT) WOUNDED. If the tank is not then actively engaged and the tank commander decides that evacuation is necessary, he commands, EVACUATE BOG, The other crew members dismount, unless one man is needed to help from inside; and the two nearest the hatch above the wounded man go to that hatch to act as the evacuation crew. If the man nearest the casualty in the tank sees that his help is needed, he stays inside and immediately starts to arrange a sling or take whatever other steps will speed the operation. One of the crew takes the first aid kit with him in dismounting, or it is removed at the first opportunity thereafter. The remaining crew member, if available, helps in lowering the casualty to the ground. Before

leaving the wounded man, whose position is marked so that he will not be run over, the tank commander reports by radio that he has lost one or more men and gives the location where they may be found.

b. To evacuate Bog (Driver). Tank commander commands, EVACUATE BOG. Driver or gunner unlocks bow gunner's hatch from inside; No. 2 opens hatch from outside.

No. 1

Kneel on inner edge of hatch.

Reach into hatch and grasp hands of casualty, straightening him in seat if necessary.

Cross arms over chest.

Raise and rotate casualty so that he faces outward.

Seat casualty on front rim of hatch; support in this position while No. 2 dismounts.

Lower trunk into arms of No. 2.

Lift legs out of hatch as No. 2 lowers body along slope plate.

Dismount. Place casualty in carry position.

Carry casualty to protected area.

No. 2

Take position to the outside rear of hatch.

Grasp nearest hand when arms are crossed.

Raise casualty and help rotate him outward.

Help' seat casualty; dismount to ground in front of Bog's hatch.

Receive and support trunk of wounded man, holding it beneath arms around chest.

Lower body along slope plate and support until No. 1 can reach ground and assist.

Place casualty in carry position.

Help No. 1 carry to protected area.

c. To evacuate cannoneer¹. Tank commander commands, EVACUATE LOADER. He dismounts to rear deck to act as No. 1. Gunner stays in the turret to act as No. 2. If time permits he traverses the turret until the hatch is near the center of the rear deck.

No. 1

Take position on rear deck behind turret hatch.

Grasp casualty by hands. Raise casualty through hatch and seat on rear edge.

Hold casualty while No. 2 dismounts to rear deck.

Pick casualty up in arms; carry to rear and lay along back edge of deck.

Help No. 2 lift trunk of casualty off tank; dismount.

Lift hips and legs off tank.

Carry casualty to protected area.

egs off

No. 2

Raise casualty as high as possible in hatch opening, holding around chest.

Help No. 1 raise casualty by lifting from below.

Dismount to rear deck.

Help No. 1 pick up casualty and carry to rear of tank; dismount.

Lift upper part of body off tank and support until No. 1 arrives to help.

Help carry casualty to protected area.

¹ Drill applicable in this form only where the casualty can be lifted by his arms, especially in the case of a big man whose shoulders are too wide for the hatch opening when his arms are lowered. In such cases the cannoneer is evacuated through the cupola hatch.

Section IX

INSPECTIONS AND MAINTENANCE

33. GENERAL. a. The tank commander is responsible for seeing that all inspections are made. He receives reports from the various crew members relative to their individual inspections, and he indicates in the trip ticket or other inspection report anything requiring the services of maintenance personnel. In supervising first echelon maintenance he uses his discretion in delegating additional responsibilities to the crew members.

b. Inspection covers all personal equipment and weapons, vehicle equipment and weapons, and mechanical features of the vehicle. In combat it includes a check of the application of protective cream by the entire crew. Checks of instruments, lights, siren, track, suspension system, and engine performance are made in accordance with provisions of the appropriate technical manual; the driver fills in the section of the trip ticket covering the mechanical condition and equipment of the vehicle and indicates required maintenance work. The trip ticket should be carefully and thoroughly prepared. Any irregularity noted and entered on it, which is not repaired before the tank is used again, should be re-entered continually until it has been properly taken care of.

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report and correct deficiencies as found. The turret is traversed as necessary to facilitate 34. BEFORE OPERATION INSPECTION, M4, M4A1. Tank locked and covered by tarpaulin. (NOTE: For training purposes, the inspection is divided into three phases, each tive operations to make the best use of the time available. They procure tools as needed, phase being completed before the next is begun. Crew members coordinate their respecthe various checks.)

PHASE A

Cannoneer		Stand inspec-		Help remove		paulin.	
Driver		Stand inspec-		Remove and	beneath tank fold tarpaulin	(4 'x 6').	
Bow Cunner		Stand inspection.		Inspect ground Remove and	beneath tank	for fuel or oil (4×6) .	jeaks.
Gunner		Stand inspection.	•	Help remove	tarpaulin.		
Tank Commander	Command: FALL IN; PREPARE FOR INSPEC-TION.	Inspect crew. Command: PER-	FORM BEFORE OPERATION	INSPECTION. Begin trip ticket;	fill out during in-	spection.	

J [.]											Release how-	itzer travel-	ing bracket.				
Lay tarpaulin	to right of	tank.															
	,	Mount to rear	deck via right	fender and	sponson.		Check fuel level	including	auxiliary gen-	erator tank.	Open cupola	hatch.	Check engine	oil level. ¹	Raise air inlet	cover.	
Mount left	sponson; un-	lock driver's	hatch; enter	tank.		Unlock bog's	hatch; clear	bow gun.	Move to turret.	Unlock hatches.	Elevate howit-	zer; traverse	turret left to	expose hand	tools and	clear air in-	let cover.
	Inspect tracks and	tank suspension.	(Visual check ad-	equate for daily	inspection of	wedge nuts or	lock pins.)			Supervise inspec-	tion made by	other crew mem-	bers.				

9 1 May be checked by cannoneer in turret compartment on some earlier models.

Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
	Pass tools to	Check clutch	Receive hand	Open rear en-
	driver.	clearance.	tools; lay out	gine doors to
	Remove breech	Close cover.	on tarpaulin	permit venti-
	covers; clear			lation.
	turret wea-			Check engine
	pons.			compartment
	Receive muzzle			for leaks.
	covers.			Remove muzzle
	Stow muzzle			covers; pass
	and breech			to gunner.
	covers.			

Command: REPORT. Report "Gunner ready". Report "Bog ready".

Report "Driver ready".

Report "Loader ready".

PHASE B

	Driver Cannoneer		Take mounted Open hatch; post. take mounted Close battery post. master Check pistol switches. Check the following: Steering Cal .50 amlevers. munition. Gear shift Spare engine lever (place and recoil in neutral). Shell crimper.
	Q		Tak Property of the property
7	Bow Gunner		Open top engine door. Check the following: Oil tank breather. Crankcase breather. Engine accessories for security and adjustment.
	Gunner		Traverse turret manually one revolution to the left!; check azimuth indicator. Make sight adjustment. Pass cleaning rods to sergeant. Check elevating
	Tank Commander	Command: PER- FORM PHASE B.	Mount to rear deck; Traverse turret help bog open manually one revolution to the left¹; check azi- muth indi- cator. Assist gunner in Make sight ad- sight adustment. Receive cleaning rods; swab bores of piece and both machine guns. Check elevating

¹ Traverse is made piecemeal and may even be reversed for short distances to coordinate with and facilitate other operations and checks.

Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
				Decontami-
			Clutch free	nating ap-
			travel.	paratus.
				Canvas
				bucket.
		Dismount.		Hull drain
	Check firing	Check hull.	Transmis-	valve be-
	controls.	drain valve in	sion oil	neath tur-
Return cleaning	Receive and	engine com-	level.	ret.
rods to gunner.	stow cleaning	partment.	Hull drain	Water con-
	rods.	Watch opera-	valve.	tainers.
Apply tape muzzle		tion of fuel	Priming	12 rounds am
covers. ²	· a	cut-off.	pump oper-	munition
Check all hatch		Listen for boost-	ation.	in right
covers.		er buzz and		sponson.
		and operation	Fuel cut-off	Spare an-
		of auxiliary	operation.	tenna.
		fuel pump.	Booster coil	Auxiliary
		Check air	operation.	genera-
		cleaners.		tor: opera-

Turn engine	Auxiliary fuel	tion, tools,
over (50 turns	-do dund	spare
with hand	eration.	parts (allow
crank).	Instruments.	to run in
	Siren.	cold wea-
Help driver	Compass.	ther prior
check lights.		to starting
)	Service and	engine).
	blackout	Open fuel
	lights.	valves.
		Check:
		Engine oil
		level. ³
		Oil dilution
		valve and
		tank for

³ May be checked by cannoneer on some earlier models; on later models checked by bow ² In bivouac and on non-tactical marches commanders will decide whether permanent type muzzle covers will be employed for convenience or greater protection. gunner from the rear deck.

✓ leaks.⁴

⁴ Later model tanks have no oil dilution valve or fuel filter cleaner.

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⁴ Later model tanks have no oil dilution valve or fuel filter clear ar.

PHASE C1

Tank Commander Command: PER- FORM PHASE C.	Gunner	Bow Gunner	Driver	Cannoneer
Move to engine compartment. Check automatic	Check the following: Gun tools,	Tighten exposed sprocket ring cap	Start engine (operate at 800 rpm).	Check machine gun tools and spare parts.
	Hand fire extinguisher. Hand grenades. SMG ammu-	5 5	During warm- up check: Instruments. Engine for	Mount AA gun; check gun and mount (adust head-
Close top engine door. Dismount.	nition, and personal equipment.	brating accessories, or parts.	of operation, unustal noises.	Help sergeant close door.

¹ The flame thrower, on tanks so equipped, is checked in this phase. The crew member using the weapon checks its condition, mechanism, and the fuel level in the tank in accordance with the appropriate published guide. It is mounted for use on order of the tank commander.

Che lo	Smoke mortar and bombs. Cal. 30. ammunition. 105-mm ammunition left of power tunnel.	Flare launcher and flares.
Driver Magnetos. Check hood for driver's hatch.	Drive tank forward at slow speed two tank lengths.	move to rear; Drive tank to tighten inside rear as di- cap screws rected by bog.
Bow Gunner Close rear engine doors.	Walk behind tank; check condition of left track shoes and inside wedge nuts or lock pins and connectors.	move to rear; tighten inside cap screws
Gunner Periscope, spare, and spare heads (in- cluding knob set-	Gunner's quadrant and case. Elevation quadrant. Telescope and mount.	
Tank Commander Direct driver to move tank for- ward two tank lengths.	Walk ahead of tank; check condition of right track shoes and inside wedge nuts or lock pins and connectors.	nuts or lock pins and connectors; watch action and
62		

Submachine gun, am-	munition,	and per-	sonal	-dinb-		η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-η-	spare, and	spare	heads.	d Turret ex-	haust fan.				- Connect break-	away plugs.			
Check the following:	Lubrication	guide.	Submachine	gun, am-	munition,	and person-	al equip-	ment.	Periscopes,	spare, and	spare	heads.	Ventilating	blower.	Connect break-	away plugs.	•		
as exposed.		Place tools in	bag.	-	Pass tools to	gunner.				Fold and stow	tarpaulin.	Open hatch.	Take mounted	post.	Check the fol-	lowing:	Gun book,	manuals	and acci-
Check howitzer and mount.		Clean chamber	and breech	mechanism.	Check recoil oil. Pass tools to	Receive and	stow tools.			Lock howitzer	and turret in	traveling po-	sition.		Connect break	away plugs.			
condition of sup- Check howitzer port rollers, shoes, and mount.	and tank suspen-	sion as tank	moves to rear.							Help bog fold and Lock howitzer	stow tarpaulin.		Take mounted	post.	Check the fol-	lowing:	Submachine gun,	ammunition,	and person-

Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
al equip-		dent form.		
ment.		Bow gun,		
Periscope, spare,		mount, and		
spare heads,		ammuni-		
and periscope		tion (adust		
holder.		head-		
Spare vision		space).		
blocks.		Cal .30 am-		
		munition.		
Flag set.		Submachine		
Binoculars.		gun, am-		
Mount antenna.		munition,		
Make 1st echelon		and person-		
radio check (para-		al equip-		
graph $5 b$).		ment.		
Complete trip		105-mm		
ticket.		rounds be-		
Connect breakaway		hind seat		
plugs.		and in right		
		sponson.		

																		Report ready
														_		ļ	Report "Driver	ready".
Check:	Escape hatch.	Periscopes,	spare, and	spare .	heads.	Tripod	mount.	Hull drain	valve.	Hand fire ex-	tinguisher.	Connect	break-	away plugs.		Report "Bog	ready".	
															Report "Gunner	ready".		
														Command: REPORT	(interphone	check).		Keport KEADY to Platoon Leader.

Cannoneer	Check stowage of equipment in turret.	Check security of: Coaxial gun. Radio. AA gun.
Driver	Check all instruments carefully.	Listen for un- usual noises.
Bow Gunner	heck opera- Watch instru- tion of eleva- ments. tion and tra- Listen for un- versing mech- usual noises. anisms.	Check security of bow gun.
Gunner	Check opera- Watch instion of eleva- ments. tion and tra- Listen for versing mech- usual nanisms.	Check security of: Turret lock. Howitzer.
Tank Commander	Remain alert to un- Check opera- usual noises or tion of eleva conditions. tion and tra- versing mech	Check radio and in- Check security Check security Listen for unterphone system. of: of bow gun. usual noises. Check security of: Turret lock. Radio antenna. Howitzer. Outside fixtures and equipment.

36. HALT INSPECTION, M4, M4AI. The length of halt determines how much of the following inspection will be completed and the normal priority of operations. The tank commander will be informed of the length of halt and will indicate how much time is to be allotted to inspection and how much for relief of the crew members. (During the inspection, the turret is traversed as necessary to facilitate those operations requiring it.)

Cannoneer	Disconnect breakaway plugs.	Ĭ	Man AA gun.	
Driver	Disconnect breakaway plugs.	Idle engine (run 4-5 minutes before stopping).	Check driver's	and bog's compartment for oil leaks.
Bow Gunner	Disconnect breakaway plugs.	Dismount. Check final drives for leaks or ex-	cessive temperature.	tank forsfuel or oil leaks.
Gunner	Disconnect breakaway plugs.	Release turret lock.	Elevate howitzer; check traverse.	Check sight adjustment.
Tank Commander Command: PER-FORM HALT INSPECTION.	Disconnect breakaway plugs.	Check radio for security.	Emerge from turret. Elevate howitzer; check traverse.	Clean vision blocks, all turret periscopes and telescope.

Check auxiliary generator operation.

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68	Tank Commander	Gunner	Bow Cunner	
	Inspect tracks and		Check towing	Ω
	tank suspension.	Check coaxial	shackles.	
	Supervise halt in-	gun and	**	Ō
	spection.	mount.		
	•	Check smoke		\Box
		mortar.		
		Check engine		H
		oil level. 1		
		Check firing		Ë

Open engine
doors.
Check engine
operation.
Inspect engine
compartment.
Take mounted Dismount; go to rear of tank. Driver

Help driver check lights. Close engine doors. Check air cleaners. controls.
Check howitzer and mount.
Place howitzer in traveling position. Lock turret

Cannoneer

post.
Stop engine
(use fuel cutoff).
Check service
and blackout
lights.
Check the following:
Steering
levers.

	Resume mounted	post. Turn off speaker.	later model tanks.
Gear shift lever. Parking brake. Clutch free travel. Transmis- sion oil level and tempera- ture. Clean peri- scopes. Connect break- away plugs.			rom rear deck on
heck stowage of equipment Mount to rear in turret. Check the fol- lowing: Engine oil level. Fuel level in all tanks. Outside equip- ment.	Take mounted post.	Clean peri- scopes.	n earlier models, f
Check stowage of equipment in turret.	Take mounted post.	Connect breakaway plugs.	B 1 Engine oil level checked in turret on earlier models, from rear deck on later model tanks.

Tank Commander	Gunnèr	Bow Cunner	Driver	Cannoneer
		Connect break-		Connect brea
٠		sould years		santa vews

Command:

REPORT. Report "Gunner

ready". Report "Bog

ready". Report "Driver

ready". Report "Loader ready".

fore Operation Inspection and covers them in the same order, with obvious modificalocked at the beginning; the check for leaks under the tank is more effective after it has stood for awhile; battery switches are turned off rather than on and only after all checks requiring use of battery power; equipment is covered and stowed rather than being un-37. AFTER OPERATION MAINTENANCE, M4 and M4A1. a. After operation the tank is immediately given whatever servicing and maintenance is needed to prepare it in every way for further sustained action. This servicing covers all the points listed in the Betions. (For example, the tank is locked at the end of the inspection instead of being uncovered and made ready for use.)

grease, ammunition (all types), first aid kit, water, and rations). All special precautions against fire will be observed while refueling. Crew members will perform the following b. The tank will be completely cleaned, serviced, and replenished (fuel, oil (all types), additional operations not covered in the Before Operation Inspection.

Cannoneer		Help gunner clean	weapons.					
Driver		Idle engine 4-5 Help gunner minutes be-	fore stopping. Clean tank sus-	pension and outside of	tank.	Help gunner	clean	weapons.
Bow Cunner			Help driver	clean tank.		Help gunner	clean	weapons.
Gunner		Clean all weapons.						
Tank Commander	Command: PER- FORM AFTER OPERATION MAINTEN- ANCE.	Complete trip ticket; forward to	platoon leader, together with re-	port of any necessary 2d echelon	maintenance, fuel,	lubricants, am-	munition and ra-	tions required.

38. PERIODIC ADDITIONAL SERVICES, M4 and M4A1. Services performed weekly

son; in combat and on maneuvers they are performed after each field operation.

7	garri	
ò	in	

Clean batteries

clean engine

driver clean engine and

deck; help

and engine

and case.

with hydro-

Take mounted

engine com-

touch up any rust spots in

Clean and

partment.

turret.

post.

compartment. Test batteries

Mount to tur-

Open engine doors and

Mount to rear

Clean turret.

Supervise inspec-

ODIC INSPEC-

TION.

Command: PER-FORM PERI-

Stand inspec-

Stand inspec-

Stand inspec-

Stand inspec-

Inspect crew.

TION.

tion.

tion.

tion.

tion.

Cannoneer

Driver

Bow Cunner

Gunner

Tank Commander

Command: FALL IN; PREPARE FOR INSPEC-

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3	

Bring cells to proper water level.	Operate auxii- iary genera-	tor to charge	batteries.		Dismount.									Help gunner	tighten	wedge nuts	or lock pins
2000	compartment	and left in-	terior of hull.								Operate and	check, hull	drain valve.	Drive tank for-	ward as re-	quired for	tightening
Oncorto con de	Operate and check hull	drain valve in	engine com-	partment.	Take mounted	post.	Clean bog's	compartment	and right in-	terior of hull.	Operate and	check hull	drain valve.				
Dismount.															Tighten all	wedge nuts	or lock pins

Cannoneer	and inspect track.	Help perform	250-mile lubrication.													Report "Loader readv".
Driver	wedge nuts or lock pins.	Perform 250-	mile lubrica- tion, referring	to appro-	priate lubri-	Close engine	doors.	Take mounted		and touch up	rust spots in	driver's com-	partment.	ı		Report "Driver ready".
Bow Gunner		Help perform	zəv-mile lubrication.					Take mounted	post; clean	and touch up	rust spots in	bog's com-	partment.		Report "Bog	ready".
Gunner	and inspect track.	Help perform	zəv-mile lubrication.											Report "Gunner	ready".	
Tank Commander													Command:	REPORT.		
74													J			

paulin. (NOTE: For training purposes, the inspection is divided into three phases, each phase being completed before the next is begun. Crew members coordinate their respec-39. BEFORE OPERATION INSPECTION, M4A3. Tank locked and covered by tarreport and correct deficiencies as found. The turret is traversed as necessary to facilitate tive operations to make the best use of the time available. They procure tools as needed, the various checks.)

PHASE A

Cannoneer	Check outside equipment.			Release how- itzer traveling bracket.
Driver		Lay tarpaulin to right of tank.		
Bow Gunner	or water leaks.	Mount to rear deck via right fender and sponson. Check engine coolant level.		Open cupola hatch. Check fuel level, includ- ing auxiliary generator tank.
Gunner		Mount left sponson; un- lock driver's hatch; enter tank. Unlock bog's hatch; clear bow gun.	Move to turret.	Unlock hatches. Open cupola Elevate how- itzer; traverse Check fuel turret left to level, inclue expose tools. ing auxiliar generator tank.
Tank Commander		Inspect tracks and tank suspension. (Visual check adequate for daily inspection of wedge nuts or lock pin.)		Supervise inspection made by other crew members.
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Open rear engine door to permit ventilation.	Check engine compartment for leaks.	Remove and pass muzzle covers to gunner.	
Receive tools; lay out on tarpaulin and check.			
Pass hand tools to driver.	Remove breech covers; clear turret wea-pons.	Receive muzzle covers. Stow muzzle and breech covers.	
			Command: REPORT.

Report "Loader ready". Report "Driver ready". Report "Bog ready". Report "Gunner ready".

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Cannoneer	Open hatch; take mounted post. Check pistol port. Check the fol- lowing: Cal .50 am- munition. Spare engine and recoil oil. Shell crimper. Decontam- inating ap- paratus.
Driver	Take mounted post. Close battery master switches. Check the following: Steering levers. Gear shift lever (place in neutral). Parking brake.
Friade B	Open top engine door. Check the following: Crankcase breather. Engine oillevel. Fan belts. Engine compartment for fuel, oil or water leaks.
Gunner	Traverse turret manually one revolution to the left 1, check azi- muth indica- tor. Make sight ad- justment. Pass cleaning rods to ser- geant. Check elevating mechanism.
Tank Commander Command: PER- FORM PHASE B.	Mount to rear deck; Traverse turret help bog open revolution to the left 1; check azimuth indicantor. Assist gunner in Make sight adsight adjustment. Receive cleaning Pass cleaning rods; swab bores of piece and both machine guns. Check elevating machine guns. Check elevating mechanism.

bucket.		Hull drain	valve	beneath	turret.	Air cleaners.	Water con-	tainers.	12 rounds	ammuni-	tion in	right spon-	son.
	Clutch free	travel.	Transmis-	sion oil	level.	Hull drain	valve.					Fuel cut-off	operation.
		Engine acces-	sories for	security	and adjust-	ment.			Listen for oper-	ation of fuel	cut-off.	Drain fuel filter.	
	Check firing	controls.			t	Help loader	cĥeck air	cleaners.		stow cleaning	rods.		
									Return cleaning	rods to gunner.	Apply tape muzzle	covers. ³	

Canvas

¹ Traverse is made piecemeal and may even be reversed for short distances to coor-² Engine oil level checked through rear door on earlier model engines, through top door dinate with and facilitate other operations and checks. on later models.

³ In bivouac and on non-tactical marches commanders will decide whether permanent type muzzle covers will be employed for convenience or greater protection.

Tank Commander	Gunner	Bow Cunner	Driver	Cannoneer
				Spare antenna.
Check all hatch covers. Dismount.		Dismount. Check engine oil level. ² Check hull drain valve in engine com- partment.	Instruments. Siren. Compass.	Auxiliary generator: Opera- tion, tools, spare parts (allow to run in cold
		Help driver check lights.	Service and blackout lights.	weather prior to starting engine).
				Open fuel valves.
				Check: Battery. Fixed fire ex-

controls. ers and

Rations and cooking stove.

Command:

REPORT.

Report "Gunner ready".

Report "Bog ready".

Report "Driver ready".

Report "Loader ready".

² Engine oil level checked through rear door on earlier model engines, through top door on later models.

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Cannoneer	Check machine gun tools and spare parts. Mount AA gun; check gun and mount (adjust headspace). Space). Check the following: Coaxial gun	and mount (adjust head-space). Smoke mortar and bombs.
Driver	Start engine (operate at idle speed until temperature reaches 100° F). During warmup check: Instruments.	smooth- ness of op- eration and unusual noises.
Bow Gunner	Tighten ex- posed sprock- et ring cap screws.	Close rear engine door.
Gunner	Check the following: Cun tools and spare parts. Hand fire extinguisher. Hand grenades. Submachine gun, am-	munition, and person- al equip- ment.
Tank Commander Command: PER-FORM PHASE C.	Move to engine compartment. Check automatic oil filter. Observe condition of exhaust.	Direct driver to move tank forward two tank lengths.

	Cal .30 am-	munition.	105-mm	ammuni-	tion left of	power	tunnel.	Flare launch-	er and	flares.	Submachine	gun, am-	munition,	and per-	sonal	equipment.
	Drive tank for-	ward at slow	speed two	tank lengths.)					Drive tank to	rear as di-	rected by bog.	Check the fol-	lowing:	Lubrication	guide.
	Walk behind	tank; check	condition of	left track	shoes and in-	side wedge	nuts or lock	pins and con-	nectors.	Direct driver to Drive tank to	move to rear;	tighten inside	cap screws as	exposed.	Place tools in	bag.
Periscope,	spare, and	spare heads	(including	knob	settings).	Gunner's	quadrant	and case.	Elevation	quadrant.	Telescope	and mount.		Check howitzer	and mount.	
	Walk ahead of tank;	check condition of	right track shoes	and inside wedge	nuts or lock pins	and connectors.		Check outer wedge	nuts or lock pins	and connectors;	watch action and	condition of sup-	port rollers, shoes,	and tank suspen-	sion as tank	moves to rear.

¹ The flame thrower, on tanks so equipped, is checked in this phase. The crew member using the weapon checks its condition, mechanism, and the fuel level in the tank in accordance with the appropriate published guide. It is mounted for use on order of the 2 tank commander.

Tank Commander	Gunner	Bow Cunner	Driver	Cannoneer
	Clean chamber and breech	Fold tarpaulin.	Submachine	Periscope, spare,
	mechanism.		gun, am-	and spare
	Check recoil oil.		munition, and person-	
	Lock howitzer		al equip-	Η
	traveling lock.		ment.	fan.
		Place tools on		
		tarpaulin on		
Mount to rear deck.		rear deck.		Connect break-
Check engine for		Mount to rear	Ventilating	away plugs.
leaks, vibrating		deck.	blower.)
accessories or			Connect break-	
parts.			away plugs.	
Help bog close		Close top)	
doors and stow		engine doors.		
tarpaulin.		Stow tarpaulin.		
Pass tools to gun-	Receive and	Open hatch.		
ner.	stow tools.	Take mounted		
Take mounted post.		post.		

<i>r</i> · .	Check the fol-	lowing:	Gun book,	manuals,	and acci-	dent form.	Bow gun and	mount (ad-	just head-	space).	Cal .30 am-	munition.	Submachine	gun, am-	munition,	and per-	sonal	equip-	ment.
Lock turret	traversing	lock.	Connect break-	away plugs.															
	Check the follow-	ing:	Submachine gun,	ammunition,	and personal	equipment.	Periscope, spare,	spare heads,	and periscope	holder.	Spare vision	blocks.	Flag set.	Binoculars.	Mount antenna.	Make 1st echelon	radio check (par-	agraph $5 b$).	Complete trip ticket.

Cannoneer

plugs.

Command: REPORT (interphone check). Report "Gunner

eport "Gunner ready". Report "Bog

epon bog ready". Reg r

Report READY to platoon leader.

Report "Driver ready". Report "Loader ready". 40. DURING OPERATION INSPECTION, M4A3. This is a continuous process for all crew members.

	Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
	Remain alert to	Check opera-	Watch instru-	Check all in-	Check stowage
	unusual noises or	tion of eleva-	ments.	struments	of equip-
		tion and tra-	tion and tra- Listen for un-	carefully.	ment in tur-
		versing	usual noises.	Check controls.	ret.
	interphone sys-	mechanisms.	Check security	Listen for un-	Check security
	tem.	Check security		usual noises.	of:
	Check security of:	of:)		Coaxial gun.
	Radio antenna.	Turret lock.			Radio.
	Outside fixtures	Howitzer.			AA gun.
~-	and equipment.				,

lowing inspection will be completed and the normal priority of operations. The tank commander will be informed of the length of halt and will indicate how much time is to be allotted to inspection and how much for relief of the crew members. (During the inspection, the turret is traversed as necessary to facilitate those operations requiring 41. HALT INSPECTION, M4A3. The length of halt determines how much of the fol-

Cunner Disconnect breakaway plugs. Release turret lock. Elevate how- itzer; check

Dismount to rear deck. Open top engine doors. Check engine operation: Inspect engine compartment. Take mounted post. Stop engine (use fuel cut-off). Check the fol-	
Mount to rear deck, Help driver open top doors. Check the following: Fuel level in all tanks. Engine coolant level. Outside equipment. Engine oil	level. 1
Check sight ad- Mount to r justment. Check auxiliary Help driver generator open top operation. Check coaxial Check the f gun and lowing: mount. Check smoke all tank mortar. Check air Check how- ment. itzer and Engine oi	mount.
Clean vision blocks, Check sight ad- Mount to rear all turret perisopes, and telescopes, and telescopes. Check auxiliary Help driver generator open top operation. Inspect tracks and Check coaxial Check the foltank suspension. Supervise halt in- Check smoke all tanks. Supervise halt in- Check smoke all tanks. Check air Engine coolcleaners. Check firing Outside controls. Check how- ment. itzer and Engine oil	· ·

¹ Engine oil level checked through rear door on earlier model engines, through top door on later models,

Cannoneer		
Driver Steering levers. Gear shift lever. Parking brake.	Clutch free travel. Transmission oil level and temperature.	Service and blackout lights. Driver's and bog's com-
Bow Gunner Close doors. Dismount.	Open rear door; check oil level; close door. ¹	Help driver check lights. Check final drives for
Gunner Place howitzer in traveling position.	Lock turret lock.	Check stowage of equipment in turret. Connect breakaway plugs.
Tank Commander		

					Resume	mounted	post.	Turn off	speaker.	Connect break-	away plugs.					Report "Loader	ready".
partments for oil	leaks.	Clean peri-	scobes.	Connect break-	away plugs.										Report "Driver	ready".	
leaks or excessive tem-	peratures.			Check towing	shackles.	Take mounted	post.	Clean peri-	scopes.	Connect break-	away plugs.			Report "Bog	ready".		
													Report "Gunner	ready".			
								Take mounted post.		Connect breakaway	plugs.	Command:	REPORT.				

¹ Engine oil level checked through rear door on earlier model engines, through top door on later models.

42. AFTER OPERATION MAINTENANCE, M443. a. After operation the tank is imway for further sustained action. This servicing covers all the points listed in the Before at the beginning; the check for leaks under the tank is more effective after it has stood quiring use of battery power; equipment is covered and stowed rather than being unmediately given whatever servicing and maintenance is needed to prepare it in every Operation Inspection and covers them in the same order, with obvious modifications. For example, the tank is locked at the end of the inspection instead of being unlocked for awhile; battery switches are turned off rather than on and only after all checks re-

b. The tank will be completely cleaned, serviced, and replenished (fuel, oil (all types), cautions against fire will be observed while refueling. Crew members will perform the grease, coolant, ammunition (all types), first aid kit, water, and rations). All special prefollowing additional operations not covered in the Before Operation Inspection. covered and made ready for use.)

Driver Bow Gunner Tank Commander Command: PER-

FORM AFTER

OPERATION MAINTEN-

Complete trip ANCE

minutes be-Idle engine 2 Clean all ticket; forward to

Help gunner

clean

	clean tank, pension and		tank.	Help gunner Help gunner		weapons. weapons.
platoon leader,	port of any neces-	sary 2d echelon	maintenance,	fuel, lubricants,	ammunition and	rations required.

43. PERIODIC ADDITIONAL SERVICES, M4A3. Services performed weekly in garrison; in combat and on maneuvers they are performed after each field operation.

Tank Commander	Gunner	Bow Gunner	Driver	Cannoneer
Command: FALL				
IN; PREPARE				
FOR INSPEC-				
TION.				
Inspect crew.	Stand inspec-	Stand inspec-	Stand inspec- Stand inspec- Stand inspec-	Stand inspec-
		4:00		+ion

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FORM INSPEC-TION. Command: PER-

Cannoneer Mount to turret. Clean batteries and case. Test batteries with hydrometer. Bring cells to proper water level.	Operate auxiliary generator to charge batteries.
Driver Open engine doors and clean engine and engine compartment. Take mounted post.	Clean driver's compartment and left interior of hull.
Bow Gunner Mount to rear deck; help driver clean engine and engine com- partment.	Operate and check hull drain valves in engine compartment. Take mounted post.
Gunner Bow Gunner Mount to turret. Mount to rear Clean turret. deck; help Clean and driver clean touch up any engine and rust spots in engine com- turret. partment.	Dismount.
Tank Commander Supervise inspec- tion.	

Drive tank for- Help gunner ward as retighten quired for wedge nuts tightening and inspect wedge nuts. Help perform 250-mile lubrication. Perform 250-mile lubrica-tion, refer-ring to ap-propriate guide. Operate and check hull drain valve. ward as required for tightening wedge nuts. Clean bog's compartment and right interior of hull. Operate and check hull drain valve. Help perform 250-mile lubrication. Tighten all wedge nuts and inspect track. Help perform 250-mile lubrication.

Cannoneer					Report "Loader ready".
Driver	Take mounted post, clean and touch up rust spots in driver's compartment.		•	Report "Driver ready".	
Bow Gunner	Take mounted post; clean and touch up rust spots in bog's com- partment.		Report "Bog ready".		
Gunner		Report "Gunner ready".			
Tank Commander		Command: REPORT.			

Section X

DESTRUCTION OF EQUIPMENT

- 44. GENERAL. a. The destruction of materiel requires a command decision and will be undertaken only on authority delegated by division or higher commanders. Destruction is ordered only after every possible measure for the preservation or salvage of the materiel has been taken, and when in the judgment of the person exercising the authority such action is necessary to prevent.
 - (1) Its abandonment in the combat zone.
 - (2) Its capture intact by the enemy.
- (3) Its use by the enemy, if captured, against our own or allied troops.
- (4) Knowledge of its existence, functioning, or exact specifications from reaching enemy intelligence.
 - b. The principles to be followed are-
- (1) Methods for the destruction of materiel subject to capture or abandonment in the combat zone must be adequate, uniform, and easily followed in the field.
- (2) Destruction must be as complete as available time, equipment, and personnel will permit. If thorough destruction of all parts cannot be completed, the most important features of the materiel should be destroyed, and parts essential to the operation or use of the materiel which cannot be easily duplicated, should be ruined or destroyed. The same essential parts must be destroyed on all like units to

prevent the enemy from constructing one complete unit from several damaged ones 'by "cannibalism".

- c. Crews will be trained in the prescribed methods of destruction, but training will not involve the actual destruction of materiel.
- d. (1) The methods outlined in the paragraphs below are given in order of effectiveness. If method No. 1 cannot be used, destruction should be accomplished by one of the other methods in order of priority shown. Adhere to the sequences.
- (2) Certain methods require special tools and equipment, such as TNT and incendiary grenades, which normally may not be items of issue. The issue of such special tools and material, the vehicles for which issued, and the conditions under which destruction will be effected are command decisions in each case, according to the tactical situation.
- **45. DESTRUCTION OF HOWITZER.** Remove sights. If evacuation is possible, carry the sights; if evacuation is not possible, thoroughly smash all periscopic sights and the telescope.
- a. Method No. 1. (1) Open drain plugs on recoil mechanism, allowing recoil fluid to drain. It is not necessary to wait for the recoil fluid to drain completely before firing the howitzer as in (4) below.
- (2) Place an armed (safety pin removed) antitank grenade, HE, or armed (safety pin removed) antitank rocket in the tube about 6 inches in front of, and with the ogive nose end toward, the HE shell in (3) below.
- (3) Set fuze on an HE shell at "superquick", insert shell in the piece and close the breech.
- (4) Attach a piece of string to the howitzer firing linkage in such a way that it may be fired by pulling

the string. Dismount from the tank (down to the left rear) and fire the piece. Elapsed time: Approximately 2 to 3 minutes.

- b. Method No. 2. Insert from three to five ½-pound TNT blocks in the bore near the muzzle, eight to ten in the chamber. Close the breechblock as far as possible without damaging the safety fuze. Plug the muzzle tightly with earth to a distance of approximately 11 inches from the muzzle. Detonate the TNT charges simultaneously.
 - c. Method No. 3. With another gun, fire HE, HEAT or AP projectiles at the tube of the piece until it is rendered useless.
 - d. Method No. 4. Insert four unfuzed M14 incendiary grenades, end to end, midway in the tube at 0° elevation. Ignite these four grenades with a fifth equipped with a 15-second Bickford fuze. The metal from the grenades will fuse with the tube and fill the grooves. Elapsed time: 2 to 3 minutes.
 - 46. DESTRUCTION OF MACHINE GUNS. a. Method No. 1. (1) Caliber .30 machine gun. Field strip. Use barrel as a sledge. Raise cover until vertical; smash cover down toward front. Deform and break backplate; deform T-slot. Wedge lock frame, back down, into top of casing between top plate and extractor cam; place chamber end of barrel over lock frame depressors and break off depressors. Insert barrel extension into back of casing, allowing the shank to protrude; knock off shank by striking with barrel from the side. Deform and crack casing by striking with barrel at side plate corners nearest feedway. Elapsed time: 2½ minutes.
 - (2) Caliber .50 machine gun. Field strip. Use barrel as a sledge. Raise cover; lay bolt in feedway; lower

cover on bolt; smash cover down over bolt. Deform backplate. Wedge buffer into rear of casing allowing depressors to protrude; break off depressors by striking with barrel. Lay barrel extension on its side. Hold down with one foot, break off the shank. Deform casing by striking side plates just back of the feedway. Elapsed time: 3½ minutes.

- b. Method No. 2. Insert bullet point of complete round into muzzle and bend case slightly, distending mouth of case to permit pulling of bullet. Spill powder from case, retaining sufficient powder to cover the bottom of case to a depth of approximately ½ inch. Re-insert pulled bullet, point first, into the case mouth. Chamber and fire this round with the reduced charge; the bullet will stick in the bore. Chamber one complete round, lay weapon on ground, and fire with a 30-foot lanyard. Use the best available cover, as this means of destruction may be dangerous to the person destroying the weapon. Elapsed time: 2 to 3 minutes.
- c. Small arms. Small arms cannot be adequately destroyed by firing with the bore stuck in the ground, with or without a bullet jammed in the muzzle.
- d. Machine gun tripod mount, caliber .30 M2. Use machine gun barrel as a sledge. Deform traversing dial. Fold rear legs, turn mount over on head, stand on folded rear legs, knock off traversing dial locking screw, pintle lock, and deform head assembly. Deform folded rear legs so as to prevent unfolding. Extend elevating screw and bend screw by striking with barrel; bend pintle yoke. Elapsed time: 2 minutes.
- 47. DESTRUCTION OF TANK. a. Method No. 1. (1) Remove and empty the portable fire extinguishers.

Smash the radio (paragraph 52). Puncture fuel tanks. Use fire of caliber .50 machine gun, or a cannon, or use a fragmentation grenade for this purpose. Place TNT charges as follows: 3 pounds between engine oil cooler and right fuel tank; 2 pounds under left side of transmission as far forward as possible. Insert tetryl nonelectric caps with at least 5 feet of safety fuse in each charge. Ignite the fuses and take cover. Elapsed time: 1 to 2 minutes, if charges are prepared beforehand and carried in the vehicle.

- (2) If sufficient time and materials are available, additional destruction of track-laying vehicles may be accomplished by placing a 2-pound TNT charge about the center of each track-laying assembly. Detonate those charges in the same manner as the others.
- (3) If charges are prepared beforehand and carried in the vehicle, keep the caps and fuses separated from the charges until used.
- b. Method No. 2. Remove and empty the portable fire extinguishers. Smash the radio (paragraph 52). Puncture fuel tanks (see a (1) above). Fire on the vehicle using adjacent tanks, antitank or other artillery, or antitank rockets or grenades. Aim at engine, suspension, and armament in the order named. If a good fire is started, the vehicle may be considered destroyed. Elapsed time: About 5 minutes per vehicle. Destroy the last remaining vehicle by the best means available.

48. DESTRUCTION OF AMMUNITION, a. General,

- (1) Time will not usually permit the destruction of all ammunition in forward combat zones.
- (2) When sufficient time and materials are available, ammunition may be destroyed as indicated

- below. At least 30 to 60 minutes may be required to destroy adequately the ammunition carried by combat units.
- (3) In general, the methods and safety precautions outlined in Chapter 4, TM 9-1900, should be followed whenever possible.
- b. Unpacked complete round ammunition. (1) Stack ammunition in small piles. (Small arms ammunition may be heaped.) Stack or pile most of the available gasoline in cans and drums around the ammunition. Place on pile all available inflammable material such as rags, scrap wood, and brush. Pour the remaining available gasoline over the pile. Sufficient inflammable material must be used to insure a very hot fire. Ignite the gasoline and take cover.
- (2) Destroy 105-mm ammunition by sympathetic detonation, using TNT. Stack the ammunition in two stacks about 3 inches apart, with fuses in each stack toward each other. Place TNT charges between the stacks. Use 1 pound of TNT per four or five rounds of ammunition. Detonate all charges of TNT simultaneously from cover.
 - c. Packed complete round ammunition. (1) Stack the boxed or bundled ammunition in small piles. Cover with all available inflammable materials, such as rags, scrap wood, brush, and gasoline in drums or cans. Pour gasoline over the pile. Ignite the gasoline and take cover. (Small arms ammunition must be broken out of the boxes or cartons before burning.)
 - (2) (a) The destruction of packed complete round ammunition by sympathetic detonation with TNT is not advocated for use in forward combat zones. To insure satisfactory destruction involves putting TNT in alternate cases or bundles of ammunition, a time-consuming job.

- (b) In rear areas or fixed installations, sympathetic detonation may be used to destroy large ammunition supplies if destruction by burning is not feasible. Stack the boxes, placing in alternate boxes in each row sufficient TNT blocks to insure the use of 1 pound of TNT per four to five rounds of 105-mm ammunition. Place the TNT blocks at the fuse end of the rounds. Detonate all TNT charges simultaneously. See FM 5–25 for details of demolition planning and procedure.
- d. Miscellaneous. Grenades, antitank mines, and antitank rockets may be destroyed by the methods outlined in b and c above for complete rounds. The amount of TNT necessary to detonate these munitions is considered less than that required for detonating artillery shells. Fuses, boosters, detonators, and similar material should be destroyed by burning.
- 49. FIRE CONTROL EQUIPMENT. Fire control equipment, including optical sights and binoculars, is difficult to replace. It should be the last equipment to be destroyed. If evacuation of personnel is made, all possible items of fire control equipment should be carried. If evacuation of personnel is not possible, fire control equipment must be thoroughly destroyed as indicated below.
- a. Firing tables, trajectory charts, slide rules and similar items should be thoroughly burned.
- b. All optical equipment that cannot be evacuated will be thoroughly smashed.
- 50. RADIO EQUIPMENT. a. Books and papers. Instruction books, circuit and wiring diagrams, records of all kinds for radio equipment, code books, and registered documents will be destroyed by burning.

- b. Radio sets. (1) Shear off all panel knobs, dials, etc., with an ax. Break open the set compartment by smashing in the panel face, then knock off the top, bottom, and sides. The object is to destroy the panel and expose the chassis. On top of the chassis, strike all tubes and circuit elements with the ax head. On the under side of the chassis, if it can be reached, use the ax to shear or tear off wires and small circuit units. Break sockets and cut unit and circuit wires. Smash or cut tubes, coils, crystal holders, microphones, earphones, and batteries. Break mast sections and break mast base at the insulator.
- (2) When possible, pile up smashed equipment, pour on gas or oil, nad set it on fire. If other inflammable material, such as wood, is available, use it to increase the fire. Bury smashed parts.

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